SAMPLING AND ANALYSIS PLAN – REVISION 1

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
OPERABLE UNIT 2 – BUILDING DEMOLITION
SOUTH PLAINFIELD, NEW JERSEY

CLUSTER 12

CONTRACT # W912DQ-04-D-0023
DELIVERY ORDER #0005

Prepared By:

SEVENSON ENVIRONMENTAL SERVICES, INC.
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November 2006
Revised: December 5, 2006

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
OPERABLE UNIT 2 – BUILDING DEMOLITION
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SAMPLING AND ANALYSIS PLAN

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- Data Evaluation Checklist

Appendix B: Analytical Laboratory Quality Assurance/Quality Control Plan

List of Abbreviations and Acronyms

CIH	Certified Industrial Hygienist
cm^2	Square Centimeters
COC	Chain-of-Custody
CQC	Contractor Quality Control
CQCSM	Contactor Quality Control Systems Manager
DCQCR	Daily Chemical Quality Control Report
DQO	Data Quality Objective
FCR	Field Change Request
FedEx	Federal Express
FSP	Field Sampling Plan
HNO_3	Nitric Acid
IDW	Investigation Derived Waste
µg	Microgram
mL	Milliliter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCR	Non-Conformance Report
NJDEP	New Jersey Department of Environmental Protection
OU-2	Operable Unit 2
Oz	Ounce
PCB	Polychlorinated Biphenyl
pCi/g	Picocuries per gram
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCSR	Quality Control Summary Report
RDCSCC	Residential Direct Contact Soil Cleanup Criteria
SAP	Sampling and Analysis Plan
Sevenson	Sevenson Environmental Services, Inc.
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
SSHERP	Site Safety, Health, and Emergency Response Plan
SVOC	Semi-Volatile Organic Compound
TCLP	Toxicity Characteristic Leachate Procedure
TSCA	Toxic Substances Control Act
UPS	United Parcel Service
USACE	US Army Corps of Engineers
USDOT	US Department of Transportation
USEPA	US Environmental Protection Agency
VOC	Volatile Organic Compound
WST	Waste Stream Technology, Inc.

1.0 PROJECT DESCRIPTION

1.1 Introduction

This Field Sampling Plan (FSP) is part of the Sampling and Analysis Plan (SAP), which has been prepared by Sevenson Environmental Services, Inc. (Sevenson) to fulfill the requirements of Contract W912DQ-04-D-0023, Delivery Order 0005 for the U.S. Army Corps of Engineers (USACE) at the Cornell-Dubilier Electronics Superfund Site (site), located in South Plainfield, New Jersey. The purpose of the SAP is to ensure that all data obtained from sampling during the implementation of the remedial action at the Site are of known and acceptable quality, legally defensible, and meet the requirements of the contract specifications and USACE Engineering Manual EM 200-1-3 (Requirements for the Preparation of Sampling and Analysis Plans, February 2001). The FSP describes the field sampling activities that must be performed and defines the procedures and methods that must be used to collect field measurements and samples. The FSP focuses on the performance of all data quality management activities and specifies the procedures for sample collection, packaging, shipping, and analysis. Additionally, the FSP describes field-sampling deliverables. The overall objective of the FSP is to develop and ensure the implementation of procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide legally defensible data of known quality. The FSP provides a framework to ensure that all sampling and analytical data are of known and acceptable quality required for meeting the needs of the end use of data.

1.2 Site Description

The site is located at 333 Hamilton Boulevard in South Plainfield, New Jersey in what is now the Hamilton Industrial Park occupied by an estimated fifteen commercial businesses. Through the years, numerous companies have operated at the site as tenants. It is estimated that approximately 540 people reside within 0.25 miles of the site and the nearest residential homes are less than 200 feet from the site (USEPA, 2006). An unnamed tributary to the Bound Brook traverses the southeast corner of the site property. A site location map is included as Figure 1-1. Operable Unit 2 (OU-2) addresses the remediation of source materials, including contaminated facility soils and buildings. OU-2 has been divided into clusters; Figure 1-2 shows a site plan with the cluster designations.

1.3 Site History and Contaminants

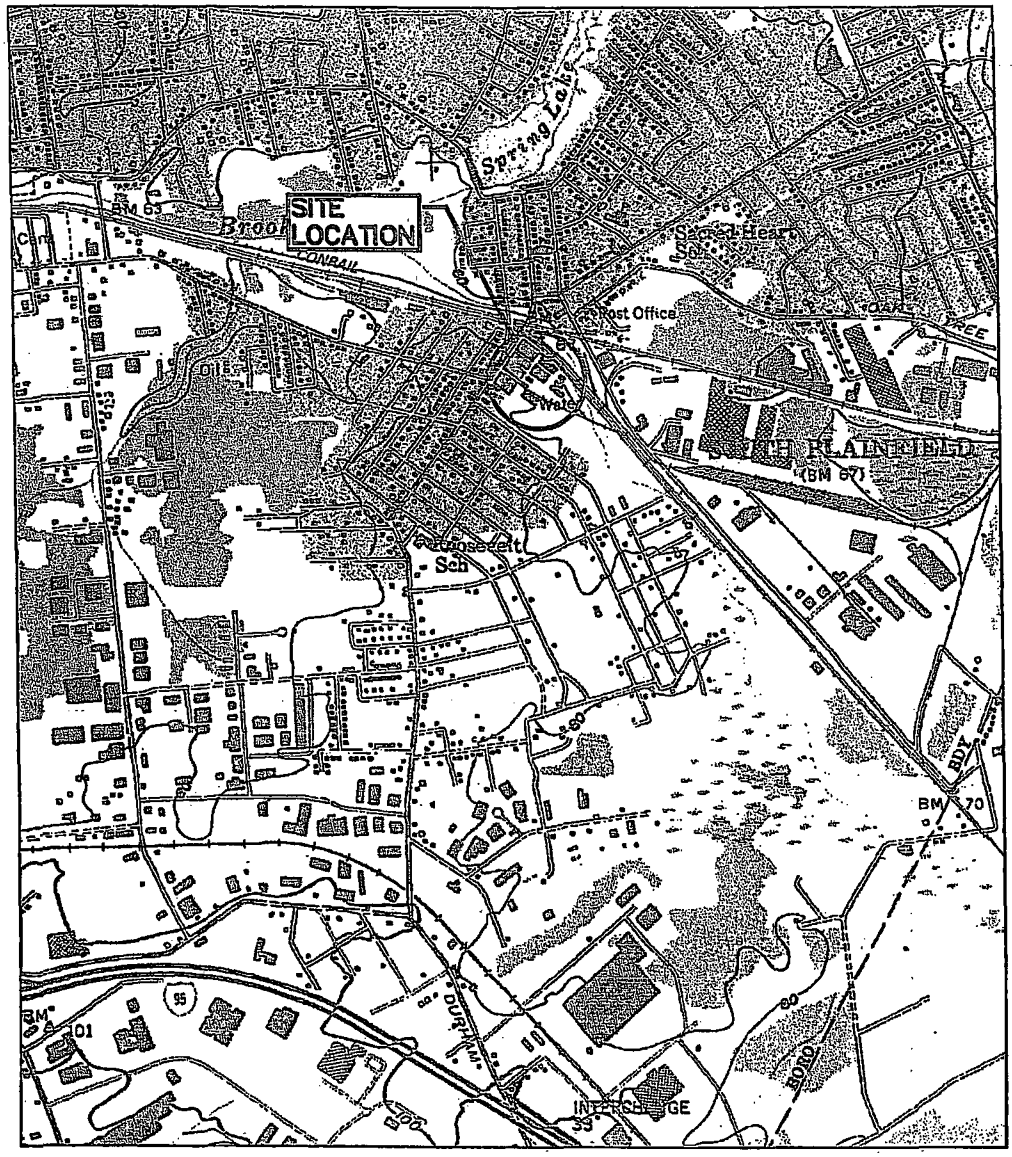
Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, including capacitors, from 1936 to 1962. Polychlorinated biphenyls (PCBs) and chlorinated organic degreasing solvents were used in the manufacturing process. It is alleged that during the period of operation, Cornell-Dubilier Electronics, Inc. dumped PCB-contaminated materials and other hazardous substances directly onto site soils. A former employee has claimed that the rear of the property was saturated with transformer oils and that capacitors were also buried behind the facility during the same time period (Foster Wheeler, 2002).

The soil at the site is contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), inorganic constituents, and PCBs. In addition, building interiors at the site have been found to contain elevated levels of PCBs and metals. Historical site data pertaining to OU-2 was collected between 1997 and 2002 and are summarized in the *Final Remedial Investigation Report for OU-2 Onsite Soils and Buildings* (Foster Wheeler, 2002). In addition, summary tables of historical data pertaining to OU-2 buildings are included in the *Data Summary Report, Operable Unit 2 – Building Demolition, 100% Completion Phase* (Malcolm Pirnie, 2006).

1.4 Site Specific Definition of the Problem

Work is being conducted at the Cornell-Dubilier Electronics Superfund Site due to contamination found in soil and building materials associated with past industrial operations conducted at the site. Sevenson will be responsible for demolition of structures; transportation of all waste and offsite disposal of all waste including demolition debris and soil resulting from demolition; site restoration with backfill and pavement; sampling and analysis of soil, water, air, and building material; and other activities necessary for complete and proper demolition of the site.

FIGURE 1-1: SITE LOCATION MAP



SOURCE: U.S.G.S. TOPOGRAPHIC MAP,
7.5 MINUTE SERIES, PLAINFIELD, NEW JERSEY
QUADRANGLE, 1955, PHOTOREVISED 1981

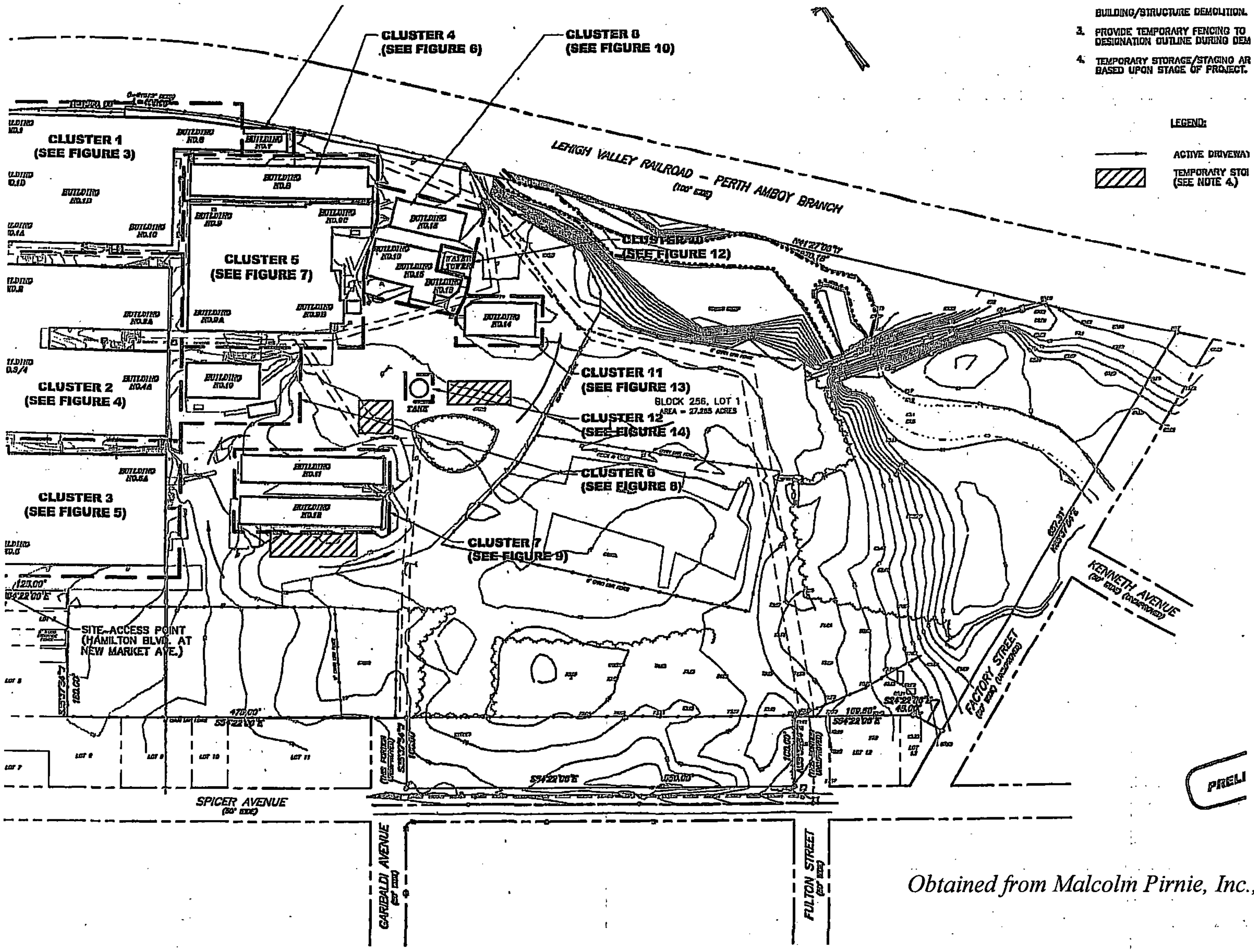
REF:

MALCOLM PIRNIE	U.S. ARMY CORPS OF ENGINEERS CORNELL-DUBILIER SUPERFUND SITE SOUTH PLAINFIELD, NJ CONTRACT No: W912DQ-06-D-006	SITE LOCATION MAP SCALE AS NOTED	MALCOLM PIRNIE, INC. JUNE 2006 FIGURE 1

User: WELSHANS Spec: PIRNIE STANDARD File: F:\Projects\4553023\CADD\Figures\SITE-LOCATION-4553023.DWG Scale: 1:1 Date: 06/19/2006 Time: 13:28 Layout: FIGURE 1

Obtained from Malcolm Pirnie, Inc., 2006

FIGURE 1-2: SITE PLAN WITH CLUSTER DESIGNATIONS



Obtained from Malcolm Pirnie, Inc., 2006

3.0 SCOPE AND OBJECTIVES

The scope of the remedial action involves the removal and offsite disposal of site buildings and structures. Specific work items include:

- Verifying the location of and disconnecting all utilities to the individual buildings and structures.
- Acquiring all necessary permits and licenses.
- Implementing site monitoring and controls including temporary fencing and security.
- Removal, separation, and offsite disposal of trash, tires, and other wastes located within buildings to be demolished and throughout the site.
- Asbestos removal and disposal.
- Demolition of buildings and structures.
- Sampling, testing, removal, and disposal of hazardous materials and special wastes including PCB-containing materials and equipment, metals, transformers, and capacitors to an approved recycling or disposal facility.
- Foundation restoration.

Samples will be collected for characterization of debris, soil, concrete, and water to determine the offsite disposal requirements. In addition, samples will be collected to determine backfill and topsoil quality prior to bringing such materials to the site. Details of the sample collection procedures are included in Section 4.0 of this FSP.

3.1 Waste Characterization Samples

Debris, soil, concrete, and water samples will be collected for waste characterization and disposal facility approval. Samples for metal, VOC, SVOC, pesticide, and herbicide analyses will undergo toxicity characteristic leachate procedure (TCLP) extractions prior to laboratory analysis. Samples for PCB analysis will be analyzed for total PCBs. Waste characterization samples will be compared against the 40CFR261 *Characteristics of Hazardous Waste* and 40CFR761 *PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions* to determine the disposal requirements. The regulatory criteria are summarized in Table 3-1. Any debris or soils containing concentrations of total PCBs greater than the regulatory standards will be disposed of as PCB remediation wastes.

TABLE 3-1: WASTE CHARACTERIZATION - MAXIMUM ALLOWABLE CONCENTRATIONS OF CONTAMINANTS		
Contaminant	**Regulatory Level**	**Laboratory Reporting Limit**
Metals (mg/L)		
Arsenic	5.00	0.045
Barium	100.00	0.025
Cadmium	1.00	0.025
Chromium	5.00	0.025
Lead	5.00	0.075
Mercury	0.20	0.001
Selenium	1.00	0.095
Silver	5.00	0.025
Volatile Organic Compounds (µg/L)		
Benzene	500	10.0
2-Butanone	200,000	100.0
Carbon Tetrachloride	500	10.0
Chlorobenzene	100,000	10.0
Chloroform	6,000	10.0
1,2-Dichloroethane	500	10.0
1,1-Dichloroethene	700	10.0
Tetrachloroethene	700	10.0
Trichloroethene	500	10.0
Vinyl Chloride	200	10.0
Semi-Volatile Organic Compounds (µg/L)		
Cresols (o, m, and p)	200,000	24.0
1,4-Dichlorobenzene	7,500	8.0
2,4-Dinitrotoluene	130	8.0
Hexachlorobenzene	130	8.0
Hexachlorobutadiene	500	8.0
Hexachloroethane	3,000	8.0
Nitrobenzene	2,000	8.0
Pentachlorophenol	100,000	16.0
Pyridine	5,000	8.0
2,4,5-Trichlorophenol	400,000	8.0
2,4,6-Trichlorophenol	2,000	16.0
Pesticides (µg/L)		
Chlordane	30	0.800
Endrin	20	0.040
Heptachlor	8	0.040
Lindane (gamma-BHC)	400	0.040
Methoxychlor	10,000	0.040
Toxaphene	500	1.00

TABLE 3-1: WASTE CHARACTERIZATION - MAXIMUM ALLOWABLE CONCENTRATIONS OF CONTAMINANTS		
Contaminant	**Regulatory Level**	**Laboratory Reporting Limit**
Herbicides (µg/L)		
2,4-D	10,000	0.40
2,4,5-TP (Silvex)	1,000	0.40
PCBs (mg/Kg)		
Total PCBs	50	0.0033 (per Aroclor)

3.2 Topsoil and Backfill Materials

Samples of topsoil and backfill materials from each offsite source will be collected and analyzed to verify that these materials do not contain contaminant levels that are hazardous to human health or the environment. Written approval from USACE will be received prior to bringing backfill or topsoil to the Site. New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Cleanup Criteria (RDCSCC) will be used to determine if borrow materials are free from contamination. A summary of the NJDEP RDCSCC are included in Table 3-2. Offsite source materials shall be analyzed for uranium and thorium decay chains. Analysis for the uranium and thorium decay chains will occur via gamma spectroscopy and use prominent nuclides such as radium-226 and radium-228 to assess the levels within these decay chains. The maximum acceptable levels for radiological testing of the off-Site source materials are the sum of radium-226 and radium-228 not to exceed 3 pico Curies per gram (pCi/g). With the exception of potassium-40, no other isotope shall exceed 5pCi/g. The radiological analytical method must be able to achieve a laboratory reporting limit of 1pCi/g.

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
TCL VOCs (µg/Kg)		
Acetone	1,000,000	10.0
Acrylonitrile	1,000	10.0
Benzene	3,000	2.0
Bromodichloromethane	11,000	2.0
Bromoform	86,000	2.0
Bromomethane	79,000	10.0
2-Butanone	1,000,000	10.0
Carbon Tetrachloride	2,000	2.0
Chlorobenzene	37,000	2.0

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
Chloroform	19,000	2.0
Chloromethane	520,000	10.0
Dibromochloromethane	110,000	2.0
1,1-Dichloroethane	570,000	2.0
1,2-Dichloroethane	6,000	2.0
1,1-Dichloroethene	8,000	2.0
cis-1,2-Dichloroethene	79,000	2.0
trans-1,2-Dichloroethene	1,000,000	2.0
1,2-Dichloropropane	10,000	2.0
cis&trans-1,3-Dichloropropene	4,000	2.0
Ethylbenzene	1,000,000	2.0
Methylene Chloride	49,000	2.0
4-Methyl-2-Pentanone	1,000,000	10.0
Styrene	23,000	2.0
1,1,1,2-Tetrachloroethane	170,000	2.0
1,1,2,2-Tetrachloroethane	34,000	2.0
Tetrachloroethene	4,000	2.0
Toluene	1,000,000	2.0
1,1,1-Trichloroethane	210,000	2.0
1,1,2-Trichloroethane	22,000	2.0
Trichloroethene	23,000	2.0
Vinyl Chloride	2,000	10.0
Xylenes (Total)	410,000	4.0
TCL SVOCs (μg/Kg)		
Acenaphthene	3,400,000	67
Anthracene	10,000,000	67
Benzo(a)anthracene	900	67
Benzo(a)pyrene	660	67
Benzo(b)fluoranthene	900	67
Benzo(k)fluoranthene	900	67
Benzyl Alcohol	10,000,000	67
Butylbenzylphthalate	1,100,000	67
di-n-Butylphthalate	5,700,000	67
4-Chloroaniline	230,000	67
bis(2-Chloroethyl)Ether	660	67
bis(2-Chloroisopropyl)Ether	2,300,000	67
4-Chloro-3-Methylphenol	10,000,000	133
2-Chlorophenol	280,000	130
Chrysene	9,000	67
Dibenzo(a,h)anthracene	660	67

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
1,2-Dichlorobenzene	5,100,000	67
1,3-Dichlorobenzene	5,100,000	67
1,4-Dichlorobenzene	570,000	67
3,3'-Dichlorobenzidine	2,000	67
2,4-Dichlorophenol	170,000	130
Diethylphthalate	10,000,000	67
2,4-Dimethylphenol	1,100,000	130
Dimethylphthalate	10,000,000	67
2,4-Dinitrophenol	110,000	130
Dinitrotoluene (2,4-/2,6-mixture)	1,000	67
bis(2-Ethylhexyl)phthalate	49,000	67
Fluoranthene	2,300,000	67
Fluorene	2,300,000	67
Hexachlorobenzene	660	67
Hexachlorobutadiene	1,000	67
Hexachlorocyclopentadiene	400,000	130
Hexachloroethane	6,000	67
Indeno(1,2,3-cd)pyrene	900	67
Isophorone	1,100,000	67
2-Methylphenol	2,800,000	67
4-Methylphenol	2,800,000	67
Naphthalene	230,000	67
Nitrobenzene	28,000	67
N-Nitrosodiphenylamine	140,000	67
N-Nitroso-di-n-Propylamine	660	67
di-n-Octylphthalate	1,100,000	67
Pentachlorophenol	6,000	130
Phenol	10,000,000	130
Pyrene	1,700,000	67
1,2,4-Trichlorobenzene	68,000	67
2,4,5-Trichlorophenol	5,600,000	67
2,4,6-Trichlorophenol	62,000	130
TCL Pesticides (µg/Kg)		
Aldrin	40	0.400
4,4'-DDD	3,000	0.400
4,4'-DDE	2,000	0.400
4,4'-DDT	2,000	0.400
Dieldrin	42	0.400
Endosulfan	340,000	0.400
Endrin	17,000	0.400

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
Gamma-BHC	520	0.400
Heptachlor	150	0.400
Methoxychlor	280,000	0.400
Toxaphene	100	8.30
PCBs (µg/Kg)		
PCBs	490	3.30
TAL Metals (mg/Kg)		
Antimony	14	1.40
Arsenic	20	1.70
Barium	700	1.00
Beryllium	2	0.50
Cadmium	39	1.00
Chromium – hexavalent (VI)	240	1.00
Chromium – trivalent (III)	120,000	1.00
Copper	600	1.00
Cyanide	1100	0.50
Lead	400	4.10
Mercury	14	0.014
Nickel	250	1.00
Selenium	63	1.40
Silver	110	0.50
Thallium	2	1.30
Vanadium	370	1.00
Zinc	1500	4.00
Contaminant	**Radiological Material Action Level (pCi/g)**	
Radium-226 + Radium-228	3	
Gamma Spec (isotopes in Uranium and Thorium decay	5	
Reference: NJDEP SRP Regulations and Guidance, Last Updated 5/12/99; http://www.state.nj.us/dep/srp/regs/scc/		

3.3 PCB Wipe Samples

Wipe samples will be collected from nonporous (i.e., metal) materials in order to determine offsite disposal requirements. Wipe samples with PCB concentrations greater than 10 micrograms (µg) per 100 centimeters square (cm^2) will require disposal at a Toxic Substances Control Act (TSCA) landfill.

4.0 FIELD ACTIVITIES

Field sampling activities in support of site remediation are presented in this section. The types of samples to be collected include: solid waste disposal characterization samples, concrete samples, wastewater (i.e., decontamination water) disposal characterization samples, PCB wipe samples, and backfill/topsoil samples. Specified sample collection and identification procedures, QA/QC requirements, and standard procedures necessary for obtaining data of acceptable quality are also presented in this and subsequent sections of the FSP. Qualified personnel experienced in the type of sampling being performed will conduct all sampling. Sampling personnel will adhere to health and safety requirements provided in the SSHERP. The following sections detail the methods of collection for each of the sampling matrixes listed above.

4.1 Solid Waste Characterization Samples

Prior to intrusive remediation activities, samples will be collected from building walls and floors based on pre-established construction drawings for each cluster. Samples will be collected for waste characterization and disposal facility approval. The waste characterization samples will be analyzed for corrosivity, ignitability, hydrogen cyanide reactivity, hydrogen sulfide reactivity, toxicity characteristic leachate procedure (TCLP) VOCs, TCLP SVOCs, TCLP pesticides, TCLP herbicides, TCLP metals, and total PCBs by the contract laboratory, as summarized in Table 4-1. The sample results and the completed waste profile will be sent to the offsite disposal facility for waste shipment approval.

Waste characterization samples will be collected as chip samples or core samples, depending upon site conditions and the material to be sampled.

Chip samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). To collect a chip sample, the following procedure will be followed:

- Place a new piece of polyethylene sheeting underneath the sampling location to catch any debris produced during collection of the chip samples.
- Wearing a new pair of disposable gloves and using a dedicated chisel or paint scraper and hammer, break up the surface to be sampled. The area should be chipped to less than one-quarter inch. Record how deep the chips were taken.

Table 4-1: Sampling and Analysis Matrix

Sample	*Location*	*Rationale*	*Parameter(s)*	*Sample Type*	*Type of Bottles*[1,2]	*Number of Bottles*[1,2]	*Methodology*	*Holding Time*[3]	*Preservative*
Solid Waste Characterization	Building walls and floors per construction drawings	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Ignitability	Composite	32oz. CWM	1	SW-846 1010	7 days	Cool 4°C
			Corrosivity				SW-846 9045C	Immediately	
			Reactive Cyanide				SW-846 Section 7.4.3.2/ Method 9014	14 days	
			Reactive Sulfide				SW-846 Section 7.4.4.2/ Method 9034	7 days	
			TCLP Metals				SW-846 1311/3015/6010B/ 7470A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	
			TCLP SVOCs				SW-846 1311/3510C/8270C	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Pesticides				SW-846 1311/3510C/8081A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Herbicides				SW-846 1311/3510C/8151A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			Total PCBs	Composite	4 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			TCLP VOCs	Grab	4 oz. CWM	2	SW-846 1311/5030B/8260B	14 days to TCLP extraction 14 days to analysis	Cool 4°C
Concrete	Concrete pads	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Total PCBs	Composite	2 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			TCLP Metals	Composite	2oz. CWM	2	SW-846 3050/6010B/7471A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	Cool 4°C
Subsurface Soil and Concrete	Foundation walls and surrounding soils	Determine subsurface concentrations of total PCBs in order to determine remediation requirements	Total PCBs	Composite	2 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
Wastewater[4]	Storage tank	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Ignitability	Composite	1L AG	3	SW-846 1010	7 days	Cool 4°C
			Corrosivity				SW-846 9040C	Immediately	
			Reactive Cyanide				SW-846 Section 7.4.3.2/ Method 9014	14 days	
			Reactive Sulfide				SW-846 Section 7.4.4.2/ Method 9034	7 days	
			TCLP Metals				SW-846 1311/3015/6010B/ 7470A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	

Sample	*Location*	*Rationale*	*Parameter(s)*	*Sample Type*	*Type of Bottles*[1,2]	*Number of Bottles*[1,2]	*Methodology*	*Holding Time*[3]	*Preservative*
			TCLP SVOCs				SW-846 1311/3510C/8270C	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Pesticides				SW-846 1311/3510C/8081A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Herbicides				SW-846 1311/3510C/8151A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP VOCs	Grab	40 mL G vial w/Teflon septa	4	SW-846 1311/5030C/8260B	14 days to TCLP extraction 14 days to analysis	Cool 4°C
			Total PCBs	Grab	1L AG	2	SW-846 8082	7 days to extraction 40 days to analysis	Cool 4°C
Backfill/ Topsoil	Off-Site Borrow Source(s)	Establish that backfill and topsoil material brought on-Site for restoration activities are not hazardous to human health or the environment	VOCs	Grab	EnCore™ sampler	2	SW-846 5035/8260B	48 hours to preservation by laboratory 14 days to analysis	Cool 4°C
			TCL SVOCs	Composite	2oz. CWM	2	SW-846 3550C/8270C	14 days to extraction 40 days to analysis	Cool 4°C
			TCL Pesticides	Composite	2oz. CWM	2	SW-846.3550C/8081A	14 days to extraction 40 days to analysis	Cool 4°C
			Total PCBs	Composite	2oz. CWM	2	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			Cyanide	Composite	2oz. CWM	2	SW-846 Section 7.4.3.2/ Method 9014	14 days	Cool 4°C
			TAL Metals	Composite	2oz. CWM	2	SW-846 3050/6010B/7471A	180 days to digestion 180 days to analysis (Hg 28 days)	Cool 4°C
Wipe	Non-porous surfaces	Establish disposal requirements	Total PCBs	Wipe	3"x3" gauze soaked with 1:4 acetone/hexane	1	SW-846 8082	14 days to extraction 40 days to analysis	Cool 4°C

Notes:
[1] Bottle types – *AG: Amber Glass; HDPE: High Density Polyethylene Plastic; CWM: Clear wide mouth glass jar with Teflon lid*
[2] All bottles should be filled completely with zero head space
[3] From Verified Time of Sample Collection
[4] For TCLP analysis on aqueous samples, the laboratory will filter the sample and the aqueous filtrate becomes the TCLP extract. If the aqueous sample contains visible solids, then a percent dry solids determination is performed. If the percent dry solids is >0.5% (about 50g of solids in 1L of aqueous sample), a TCLP extraction will be performed if there is at least 130g of solids present. The aqueous filtrate and TCLP extract are combined for analysis.

- Avoid scattering pieces outside of the sampling area boundary. Any pieces that fall outside of the sampling area should not be used.
- Collect the chipped pieces using a dedicated, decontaminated brush and dustpan lined with aluminum foil. Transfer the sample into the sample containers (Table 4-1).
- Each time a new sample is collected, a new pair of disposable gloves and a new sheet of aluminum foil will be used to prevent cross-contamination. In addition, if dedicated, disposable equipment is not used, the chisel and brush will be cleaned between each sample location.

Core samples will be collected as follows:

- At each sample location, a new pair of disposable gloves, safety glasses or goggles, and hearing protection will be donned.
- Place the coring device against the area to be sampled. Activate the coring device and advance the bit into the surface to the desired depth (i.e., at least one-third the depth of the concrete). Once the bit had advanced through the entire depth of the surface, the coring device will be removed and the core sample retrieved.
- The core will be placed into the sample containers (Table 4-1). If necessary, the cores will be crushed with a hammer or other appropriate means and sieved prior to filling the sample containers for submittal to the offsite laboratory.

4.2 Concrete Samples

Sampling of concrete pads will be performed in order to determine the disposal options for these materials. The concrete samples will be analyzed for TCLP metals and total PCBs by the contract laboratory, as summarized in Table 4-1. The sample results and the completed waste profile will be sent to the offsite disposal facility for waste shipment approval. Concrete samples will be collected as core samples, as follows:

- At each sample location, a new pair of disposable gloves, safety glasses or goggles, and hearing protection will be donned.
- Place the coring device against the area to be sampled. Activate the coring device and advance the bit into the surface to the desired depth (i.e., at least one-third the depth of the concrete). Once the bit had advanced through the entire depth of the surface, the coring device will be removed and the core sample retrieved.

- The core will be placed into the sample containers (Table 4-1). If necessary, the cores will be crushed with a hammer or other appropriate means and sieved prior to filling the sample containers for submittal to the offsite laboratory.

4.3 In-Situ Subsurface Soil and Concrete Samples

In-situ samples will be collected of the subsurface soil and concrete in the vicinity of known PCB-containing walls in order to determine remediation requirements. Samples will be analyzed for total PCBs by the contract laboratory, as summarized in Table 4-1. Building foundations will be exposed every 100-feet on known PCB-containing walls.

Concrete chip samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). To collect a chip sample, the following procedure will be followed:

- Wearing a new pair of disposable gloves and using a dedicated chisel or paint scraper and hammer, break up the surface to be sampled. The area should be chipped to less than one-quarter inch. Record how deep the chips were taken.
- Avoid scattering pieces outside of the sampling area boundary. Any pieces that fall outside of the sampling area should not be used.
- Collect the chipped pieces using a dedicated, decontaminated brush and dustpan lined with aluminum foil. Transfer the sample into the sample containers (Table 4-1).
- Each time a new sample is collected, a new pair of disposable gloves and a new sheet of aluminum foil will be used to prevent cross-contamination. In addition, if dedicated, disposable equipment is not used, the chisel and brush will be cleaned between each sample location.

Subsurface soil samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). The scoop/trowel method will be utilized to collected subsurface soil samples, as follows:

- Gloves will be donned immediately prior to sampling and a clean pair of new disposable gloves will be worn each time a different location is sampled.
- Insert trowel into soil to desired depth (e.g., six inches) and remove the sample.

- Place the sample into a new, clean ziplock-style bag or bowl to be homogenized. Samples will be homogenized by physically mixing the soil by hand from outside the bag or by mixing the soil by hand or with the trowel in the bowl. At no time will be bare hand come into contact with the sample.
- Transfer the sample to the appropriate container (Table 4-1). Ensure that the threads, lid, and outer edges of the sample container are free of soil particles. Use a clean paper towel to remove soil particles from the threads and sealing surface of the sample container. Make sure the container lid is firmly secure.

4.4 Wastewater Characterization Samples

Wastewaters generated during Site activities will include decontamination water and storm water which may accumulate in the remediation areas. Liquid wastes will be containerized in an aboveground storage tank. Aqueous samples will be collected to determine the waste management approach. The goal of sampling the wastewaters will be to meet Federal, state, and local regulations in accordance with the requirements of the disposal facility. Required analyses, sample container requirements, and sample analysis methods are presented in Table 4-1.

Samples will be collected using dedicated, disposable polyvinyl chloride or Teflon bailers. The following sample procedure is consistent with NJDEP sampling instructions (NJDEP, 2005):

- Prepare the work area by placing plastic sheeting on the ground to avoid cross-contamination.
- Attach a bailer to cable or line for lowering. Polyethylene or nylon rope is recommended.
- Lower the bailer slowly until it contacts the water surface.
- Allow the bailer to sink and fill.
- Slowly raise the bailer to the surface. Do not allow the bailer line or bailer to contact the ground surface.
- Fill sample bottles by tipping bailer to allow slow discharge from the top to flow gently down the side of the sample bottle with minimum turbulence. If a bottom drain is present on the bailer, achieve a slow steady flow.
- Repeat as necessary to acquire sufficient volume to fill all sample containers (Table 4-1).
- Secure all caps tightly and place the filled containers on ice immediately.
- Dispose of the bailer and line in accordance with Section 4.7. Decontaminate any non-dedicated sampling equipment.

4.5 Wipe Samples

Wipe samples will be collected in order to monitor surficial contamination on non-porous surfaces. Wipe samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). To collect a wipe sample, the following procedure will be followed:

- Place a clean, appropriately sized square template cutout over the area to be sampled (TSCA requires 100cm^2). Secure the template to avoid any shifting during the sampling activity. Do not touch or walk on marked areas.
- Wearing a new pair of gloves, obtain a sterile wrapped gauze pad. The gauze should be 3 inches square. The use of filter paper is not recommended as it tends to rip and crumble if the surface is slightly rough. If filter paper is used, it should be four-inch diameter heavy gauge paper.
- Soak the gauze pad in appropriate solvent. For PCBs, the solvent of choice is a 1:4 acetone/hexane mixture. The gauze pad should be soaked and excess squeezed out immediately before the collection of each sample. Use of pre-soaked pads is not acceptable.
- Wipe the area framed by the template cutout with the moistened gauze, using 3 or more strokes in one direction covering the entire surface. Fold the exposed side of the pad in (i.e., fold in half).
- Using the once-folded pad, wipe the sample area at right angles to the first wipe. Fold the exposed side of the pad in.
- Using the twice-folded pad, wipe the sample area again in the original direction. Fold the exposed side of the pad or filter in.
- Place the pad in a laboratory-provided sample container (i.e., 2 ounce (oz) or 40 milliliter (mL) screw top container) and replace the container cap.
- If desired, place the sample containers on ice.

4.6 Offsite Topsoil/Backfill Sampling

Backfill and topsoil from offsite sources will be tested for physical suitability and chemical parameters prior to use. Samples of topsoil and backfill materials from each offsite source will be collected and analyzed to determine that these materials do not present a threat to human health and/or the environment.

For offsite borrow materials, a minimum of one set of laboratory analysis will be performed per 5,000 cubic yards of material used. No less than one set of analyses will be performed per borrow area. As quantities of backfill/topsoil are brought onsite in excess of 5,000 cubic yards, one sample per additional 5,000 cubic yards of material will be analyzed. Documentation certifying that all criteria have been met for offsite backfill/topsoil (Table 3-2) will be forwarded to the USACE prior to bringing any material onsite.

VOC samples will be collected using 5-gram EnCore™ samplers and the spade and trowel method will be used for all other parameters. With the spade and trowel method, the top layer of the soil to desired sample depth is removed with a dedicated, pre-cleaned spade. A dedicated, pre-cleaned trowel is then used to collect samples from the desired depth. Soil samples for laboratory analysis will be collected into the appropriate containers identified in Table 4-1.

The following sampling procedure is consistent with USACE Sample Manipulation Instructions (USACE, 2001):

- The sample collection process should be completed in a minimal amount of time with the least amount of disruption as possible. Rough trimming of the sampling location surface layer should be considered if the material may have already lost VOCs (e.g., been exposed for more than a few minutes) or if other waste, different soil strata, or vegetation may have contaminated it. Surface layers can be removed by scraping the surface using a clean spade.
- Insert the clean coring tool into a fresh surface for sample collection. Take care not to trap air behind the sample. An undisturbed sample is collected by pushing the barrel of the coring tool into a freshly exposed surface and removing the corer once it is filled.
- The exterior of the barrel should be quickly wiped with a clean disposable towel to ensure a tight seal and the cap snapped on the open end.
- The sampler should be labeled, inserted into the sealable pouch, and immediately placed on ice.
- Collect samples for remaining analyses using a disposable sample trowel.
- Prepare the shipment to go to the laboratory. If samples are going to be shipped near the weekend or holiday, coordinate with the receiving laboratory to ensure that the 48-hour holding time for the EnCore™ sample is met.

The order of collection for analytical parameters will be organics and then metals. To maintain integrity of the collected samples, preservation techniques should include refrigeration and protection from light, and the sample jars should be closed immediately after filling. Gloves should be donned immediately prior to sampling and a clean pair of new disposable gloves will be worn each time a different location is sampled.

The sample trowels will be dedicated to the sample location, eliminating the need for equipment decontamination between locations and possible cross-contamination. The used sample trowels will be discarded as discussed in Section 4.7.1 of the FSP.

4.7 Investigative-Derived Wastes

Efforts will be made throughout the field program to minimize the volume of waste derived from sampling and decontamination procedures. Investigation-derived wastes (IDW) will be shipped to a commercial disposal facility, as necessary. IDW will be managed, stored, and disposed in accordance with USEPA and U.S. Department of Transportation (USDOT) regulation and requirements of the receiving facility.

4.7.1 Disposable Equipment and Debris

Disposable equipment and debris, such as health and safety equipment, plastic sheeting, sampling equipment, and other equipment or debris not reused during project operations will be collected in plastic bags during sampling and placed into appropriately labeled containers. The containers will be stored in a suitable location as determined by Site personnel. As possible, the debris will be consolidated with bulk solids for off-site disposal under an approved waste disposal profile that includes a percentage of site debris in the waste stream.

4.7.2 Wastewater

Field sampling equipment will be decontaminated following procedures specified in Section 4.9 of this FSP. Decontamination fluids and other aqueous wastes generated from sampling will be collected in the field in five gallon buckets, or other appropriate container, and returned to a designated storage area for transfer to the bulk storage tank, as appropriate. The wastewater will be sampled as described in Section 4.4 and tested as required for disposal at a permitted wastewater treatment facility.

4.7.3 General Office Trash/Debris

Any Site debris that is not generated during the collection of environmental samples will be considered municipal trash. This may include any paper or non-paper office wastes, non-contact sampling wastes (e.g., plastic wrapping, cardboard boxes), or other daily trash. All municipal trash will be deposited in a collection container provided by and serviced for periodic removal by a commercial trash hauling and disposal company. No additional management, tracking, or testing of this waste will be conducted.

4.8 QA/QC Samples

QA/QC samples will be collected and analyzed as a check of field measurements and in order to verify the contract laboratory's performance on chemical samples. QA/QC samples will be collected at a frequency of 5% of field samples collected for offsite analysis per method per matrix and will include blind field replicates, matrix and matrix spike duplicates, and temperature blanks sent to the primary laboratory. All QA/QC samples shall be identified in the Field Logbook. Confirmation of the collection of the QA/QC samples at the required frequency will be initiated by the samplers in the field, and verified by the CQCSM during field audits and the offsite project chemist during analytical data review. A log of all samples obtained, including QA/QC samples, will be maintained at the Site.

4.8.1 Replicate Samples

A field QC duplicate sample is a second sample collected at the same location as the original sample used as an indicator of overall measurement (sampling and analytical) precision. Duplicate samples are collected using identical sampling techniques, and treated in an identical manner during storage, transportation, and analysis. QC samples will be collected as one sample, homogenized and split into two samples, separately containerized and shipped as two independent samples. Field QC samples will be collected at a rate of 5 percent of the total number of field samples that are collected for laboratory analysis per matrix. Field QC samples will be shipped to the contractor's primary analytical laboratory blindly, with notations made in the daily sample log as to which environmental sample the QC sample is associated. Replicate samples will be collected, containerized, preserved, and shipped in the same manner as environmental samples per Table 4-1.

4.8.2 Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples are environmental samples to which known concentrations of target analytes have been added by the laboratory. MS and MSD samples are analyzed to evaluate the effect of the sample matrix on the analytical methodology. MS and MSD samples are generated by taking a separate aliquot of an actual field sample and spiking it with the selected target analyte(s) prior to sample preparation or extraction. The MS and MSD samples then undergo the same extraction and analytical procedures as the unfortified field sample. Additional sample volume will be collected at a rate of 5% (every 20 samples) for the analysis of MS/MSD duplicate pairs by the laboratory.

4.8.3 Temperature Blanks

Temperature blanks will accompany all sample coolers shipped from the Site. A temperature blank consists of potable water sealed in a small plastic bottle (e.g. a 40-mL polyethylene bottle). Use of these blanks enables the receiving laboratory to assess the temperature of the incoming sample shipment without disturbing any of the field samples.

4.8.4 Trip Blanks

Trip blanks will be included in all shipments containing aqueous VOC samples. A trip blank is an aliquot of analyte-free water that is sealed in a 40mL glass vial with a Teflon-lined septum cap prior to initiation of field work. These samples are kept with the field sample containers from the time they leave the laboratory until they are returned for analysis. The trip blank is used to determine whether samples are being contaminated during transit or sample collection. These sealed bottles will be prepared by the laboratory and included with each shipment of sample bottled for aqueous media to and from the laboratory and the site.

4.9 Sampling Equipment Decontamination

The following describes standard operating procedures for the decontamination of non-disposable sampling equipment and tools that may come into direct contact with a field sample intended for analytical analysis. This procedure only addresses the decontamination of equipment as it pertains to the chemical integrity of samples for analysis and is not intended for use in health and safety decontamination of personnel, materials, and equipment that may become contaminated during field operations.

4.9.1 Applicability

Decontamination of all analytical devices, sampling tools, and storage equipment that may come into direct contact with a field sample is necessary in order to achieve analytical results that are representative of true field conditions. To the extent practical, no sampling equipment will be decontaminated in the field and disposable sampling equipment will be utilized. Sufficient sampling equipment will be pre-cleaned, wrapped in aluminum foil, and brought to the field. Sample containers will be pre-cleaned in accordance with USEPA protocols and will be supplied by the laboratory.

The decontamination procedures below may be modified, upon proper managerial approval, as long as the chemical integrity of the field sample is maintained and the sample source is not permanently compromised. Anticipated contaminants and concentrations, matrices (water, air, soil, etc.), surface area of possible cross contamination, method of sampling, and many other factors are considered when establishing a sampling equipment decontamination procedure. Any modifications of the procedures below will be carefully thought out, approved by Sevenson's CQCSM and the USACE Contracting Officer or a Designated Representative, and documented accordingly. Samples will be collected from locations with the lowest known concentrations of contaminants first, progressing toward the areas of highest known contaminations. This procedure will minimize the potential for cross contamination of samples.

4.9.2 Procedures

All equipment will be considered contaminated unless determined otherwise. In order to provide consistency to the decontamination procedure, a designated sampling team crewmember will be responsible for equipment decontamination. Similarly, it is desirable to decontaminate all the equipment necessary for a field task prior to mobilization. In this way, field decontamination will be limited. As an aid to field personnel and as part of the Site QC inspections, Sevenson Checklist Number 009, "Task Specific QC Checklist – Decontamination", is included in Appendix A.

4.9.2.1 Decontamination Equipment List

The following supplies are needed for equipment decontamination:

- Clean disposable nitrile gloves
- Wastewater container (drum, basin, or buckets)
- Clean water spraying devices (plastic squirt or spray bottles)
- Clean brushes
- Plastic garbage bags
- Non-phosphate detergent (e.g., Alconox®)

- Deionized/distilled water
- Clean plastic buckets and other containers, as needed (e.g., small plastic swimming pool)
- Plastic sheeting to cover ground at work station
- Aluminum foil
- Package labels, ink pens, and black markers
- Potable water, warm if available

4.9.2.2 General Equipment Decontamination Procedure

The following steps will be considered as Sevenson's general equipment decontamination procedure:

- Cover hands with disposable gloves.
- Wash and scrub, as necessary, with a solution of non-phosphate detergent (e.g., Alconox) and potable water.
- Rinse thoroughly with potable water.
- Rinse with deionized/distilled water.
- Air dry.

All waste liquids generated by the decontamination procedure will be containerized and tested for waste characterization. Any solid wastes generated, such as personal protective equipment, will be containerized, tested for waste characterization, and transported for disposal.

Decontaminated equipment not intended for immediate use will be wrapped in aluminum foil, placed in plastic bags, and sealed. All handling of decontaminated equipment will be performed using clean disposable gloves. Care will be exercised in the storage of decontaminated equipment, so as to not re-contaminate what has been cleaned. Sampling personnel will also avoid solvents, greases, oils, gasoline, water, dusts, and other potential sources that might contaminate the equipment before its use. Sampling personnel handling such materials shall wear protective gloves when doing so.

10.0 REFERENCES

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